# Atmospheric distribution and long-range transport of Hg

Catharine Banic, Pierrette Blanchard
Ashu Dastoor, Hayley Hung
Alexandra Steffen, Rob Tordon
Laurier Poissant, Brian Wiens

**Environment Canada**

# Why Mercury?

- Mercury is a potent neurotoxin – that can cross the blood/brain barrier
- Escapes emission controls
- Susceptible to long range transport
- Biologically methylated
- Highly bioconcentrated

## Sources of mercury to the atmosphere?

**Natural**

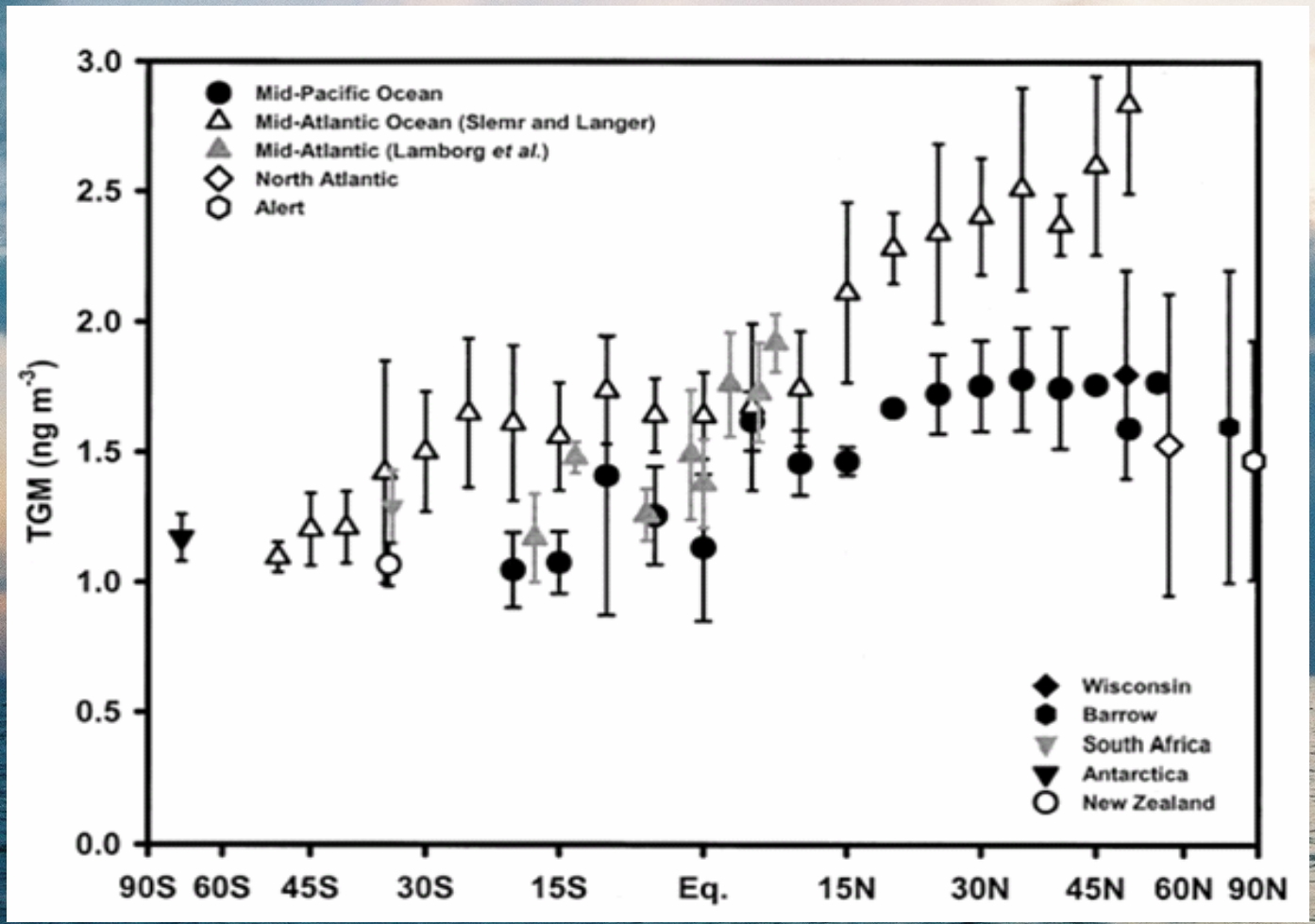
-Forest fires
-evasion from soil
-vegetation and water surfaces
-volcanoes

**Resulting from human activities**

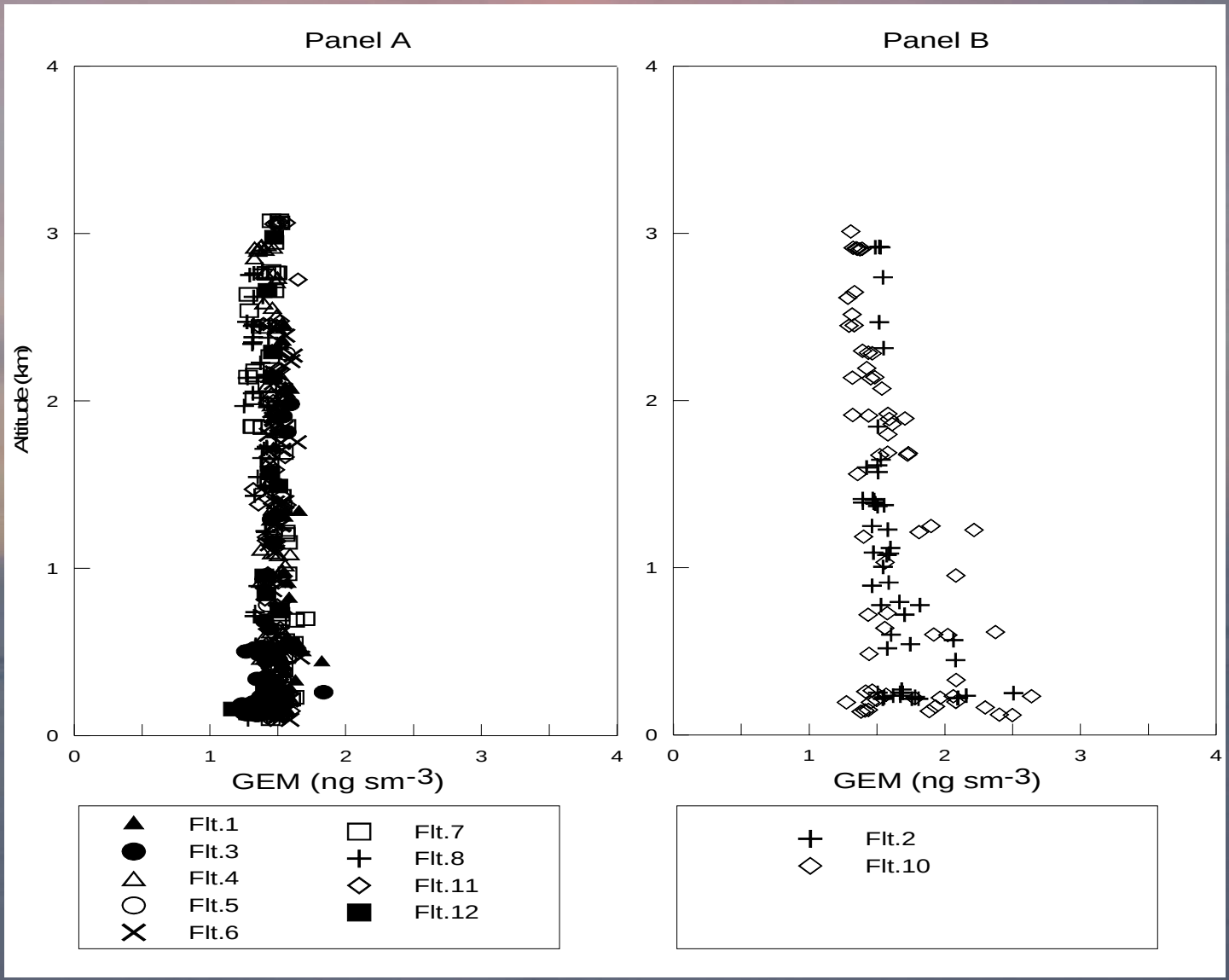
-Mining
-burning of fossil fuels
-production of metals and cement
-landfills
-flooding
-incineration plants.
-fluorescent light bulbs
-thermometers
-batteries
-dental fillings
-electrical switches.

**These human activities release considerable amount of Hg that would otherwise not be available for exposure.**

# Atmospheric Mercury Latitudinal Profiles



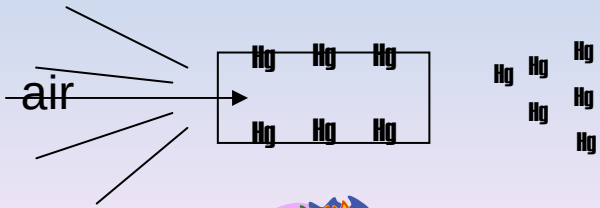
# Atmospheric Mercury Vertical Profiles, Eastern Ontario Aug. 1997



# Atmospheric Mercury Measurements

1. Gas-phase mercury
   - Elemental (GEM) (>98%)
   - Reactive (RGM)
2. Mercury on particles (p-Hg)

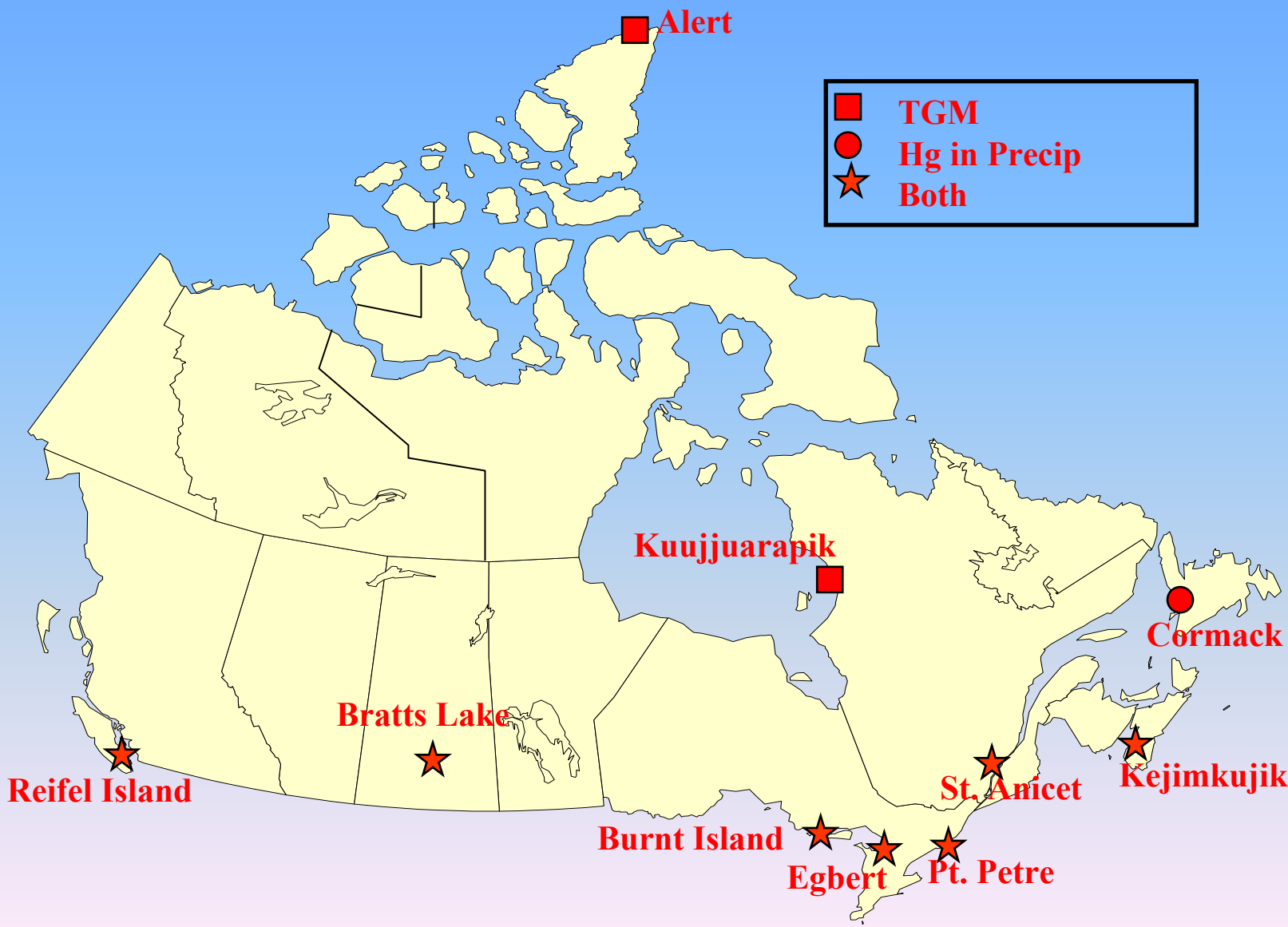
**The process:**



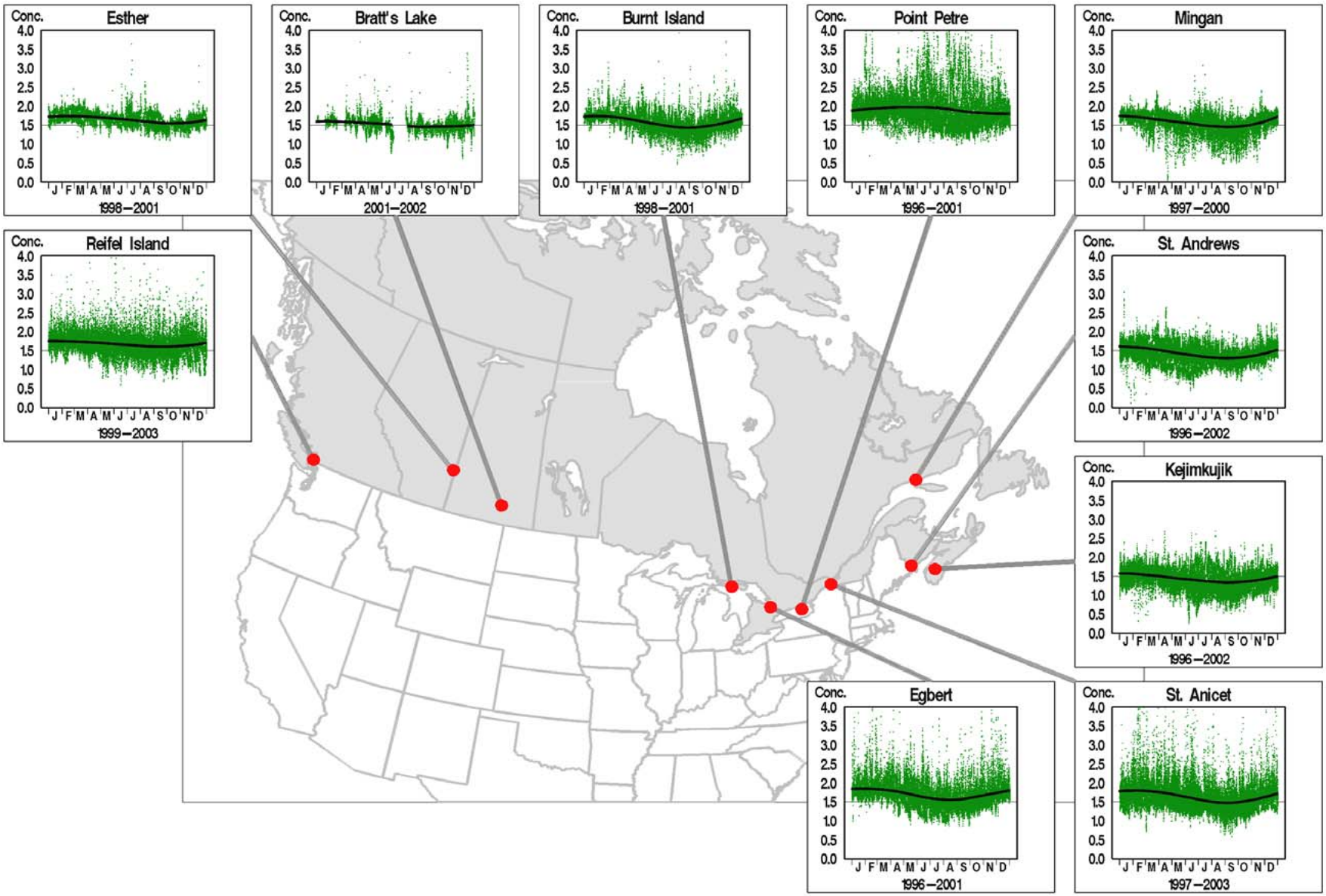

ng/m$^3$

Concentration of Hg in air

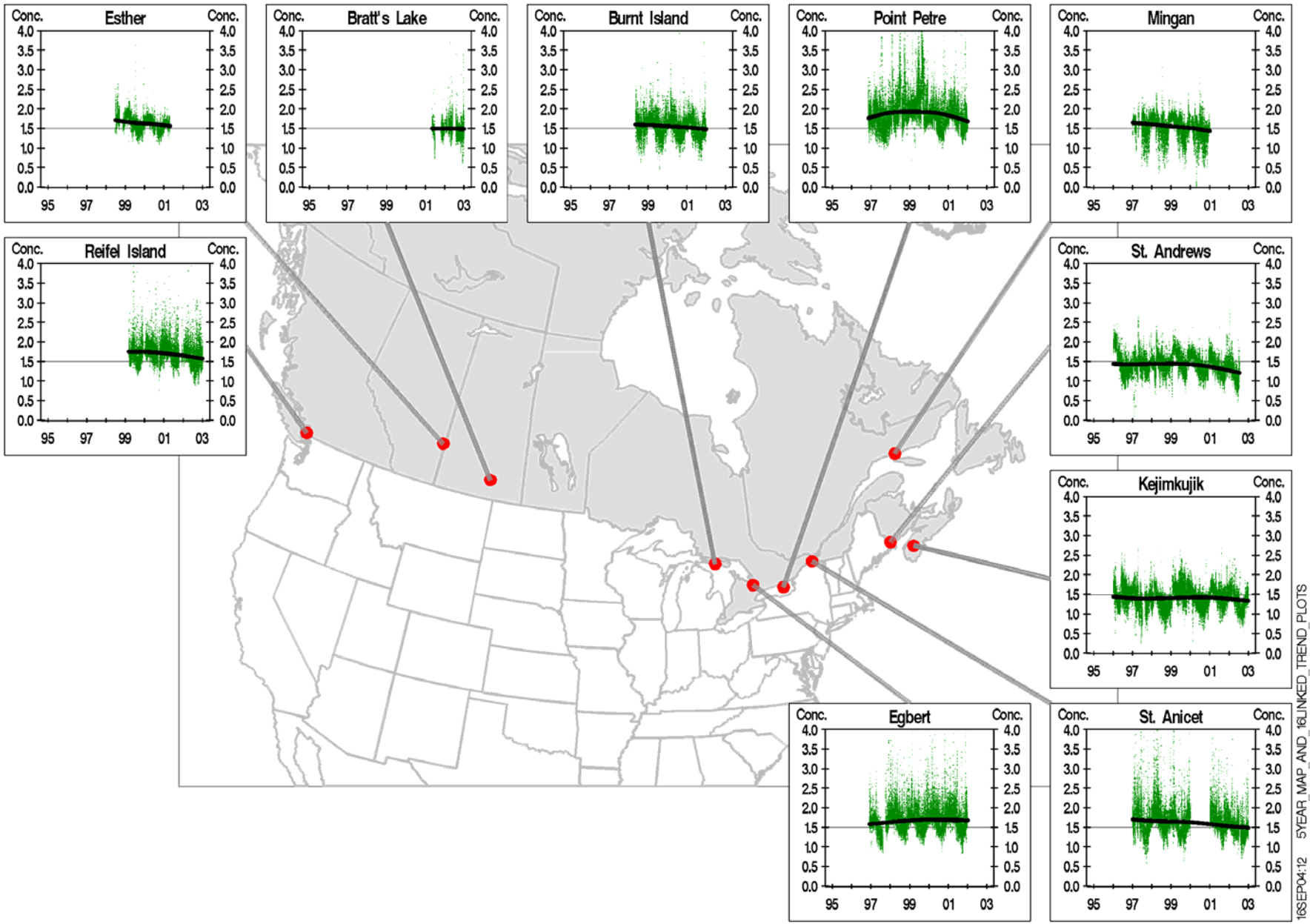
# Canadian Atmospheric Mercury Measurement Network (CAMNet)



# Gaseous Elemental Mercury (ng/m$^3$) at mid-latitude sites, Seasonality



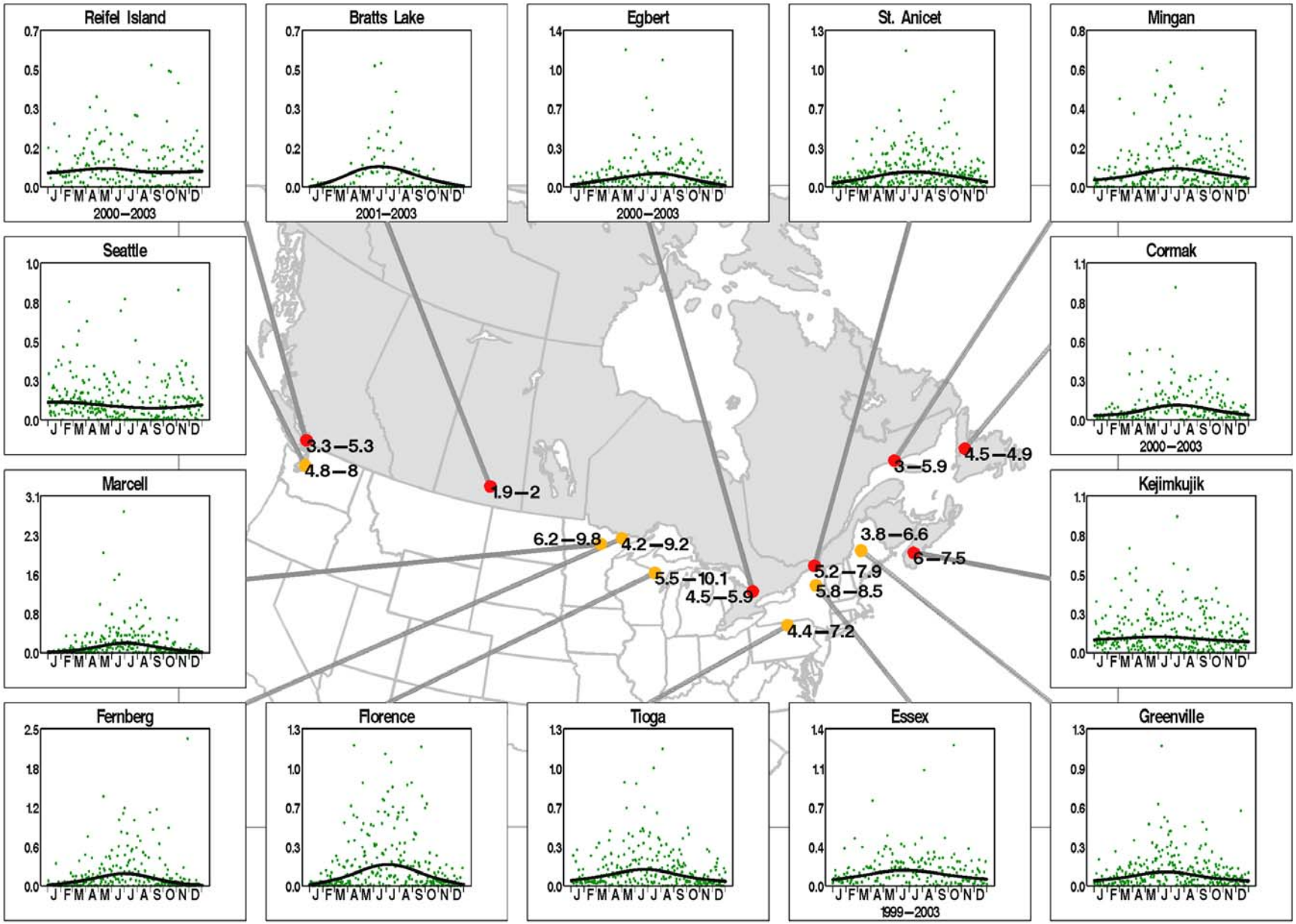
# Gaseous Elemental Mercury (ng/m$^3$) at mid-latitude sites, TemporalTrends



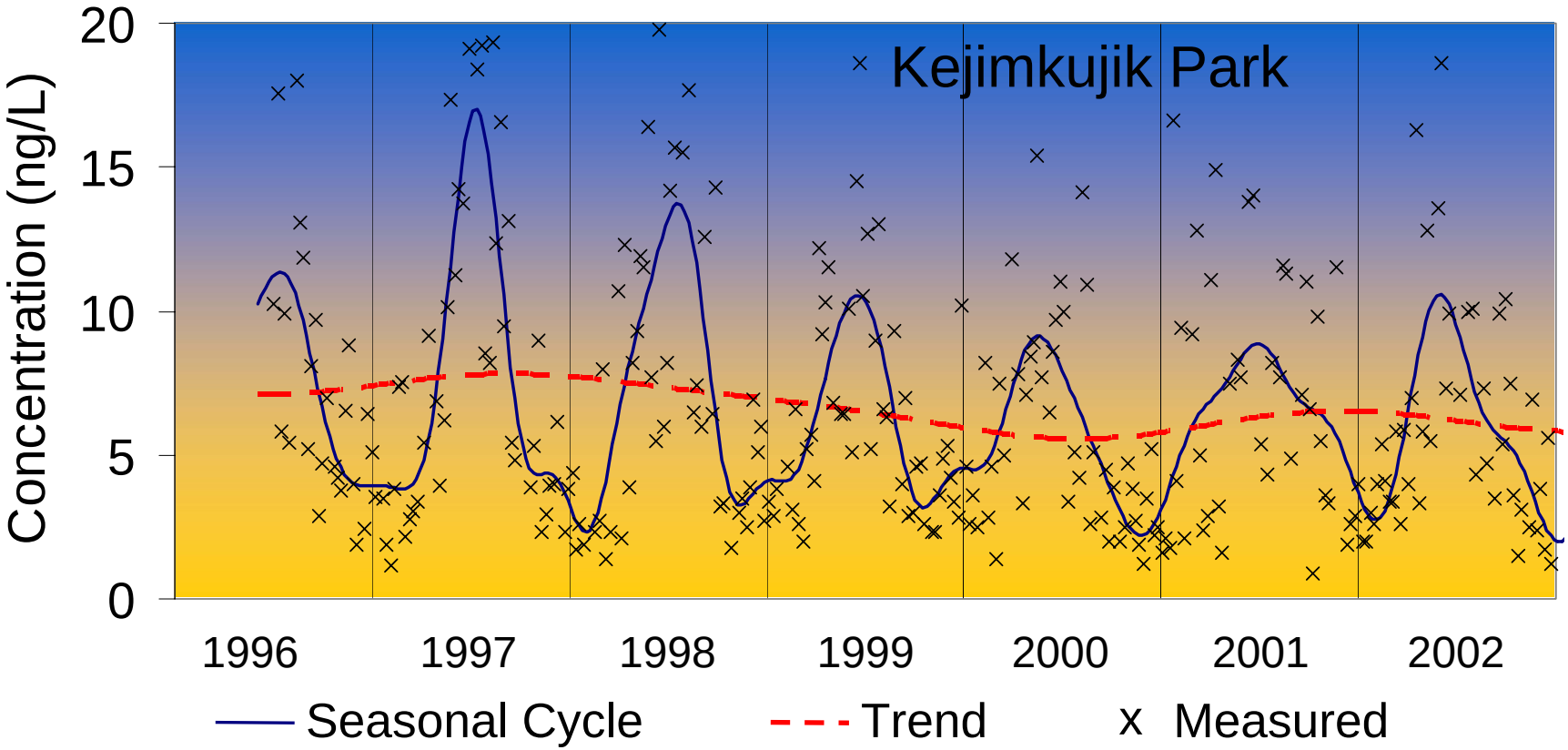
# Mercury in precipitation

Kejimkujik Park,
Nova Scotia

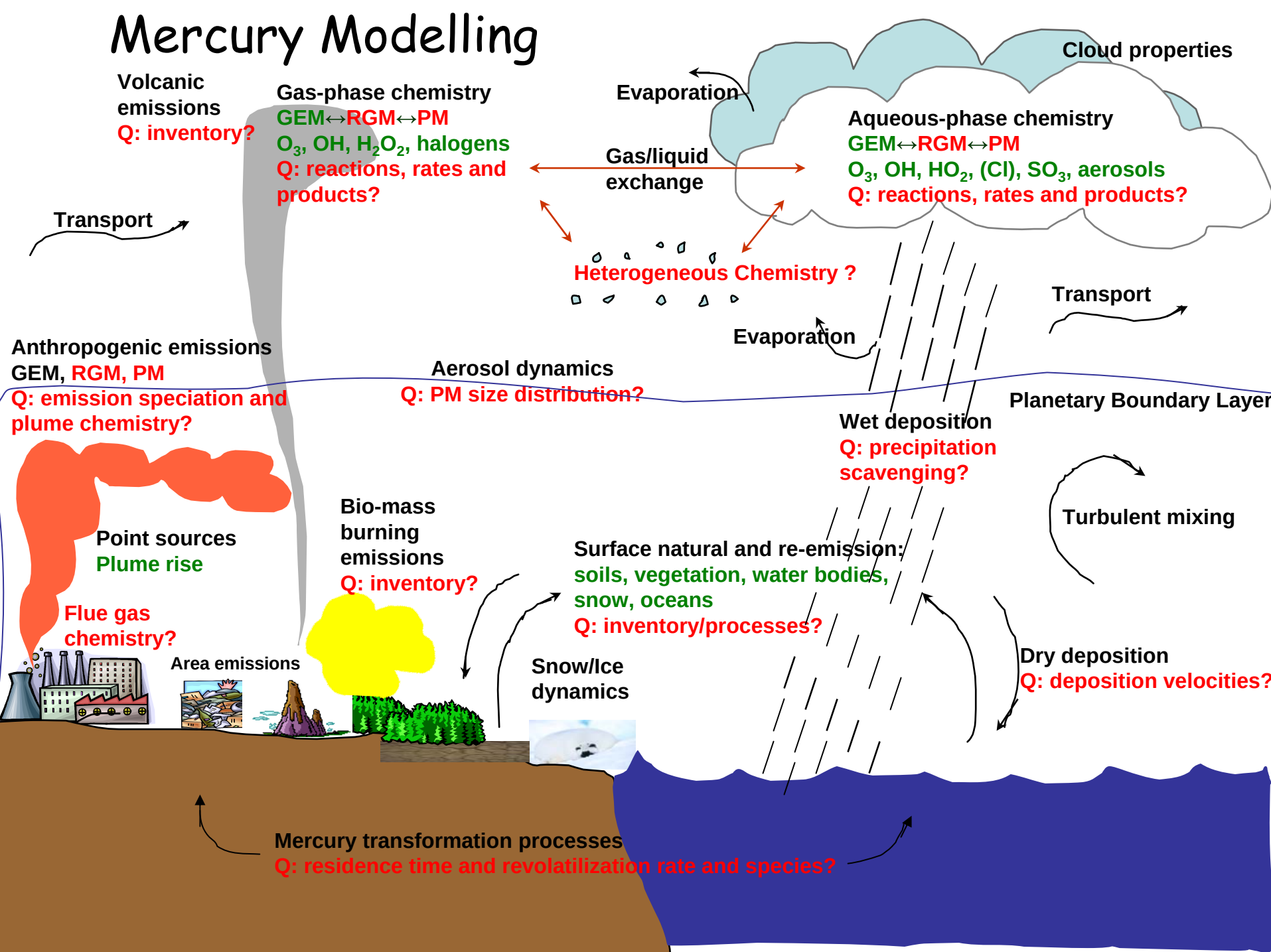
# Wet deposition of mercury in $\mu g\ m^{-2}\ week^{-1}$ (graphs) and range of annual values $\mu g\ m^{-2}\ year^{-1}$ (numbers at sites)



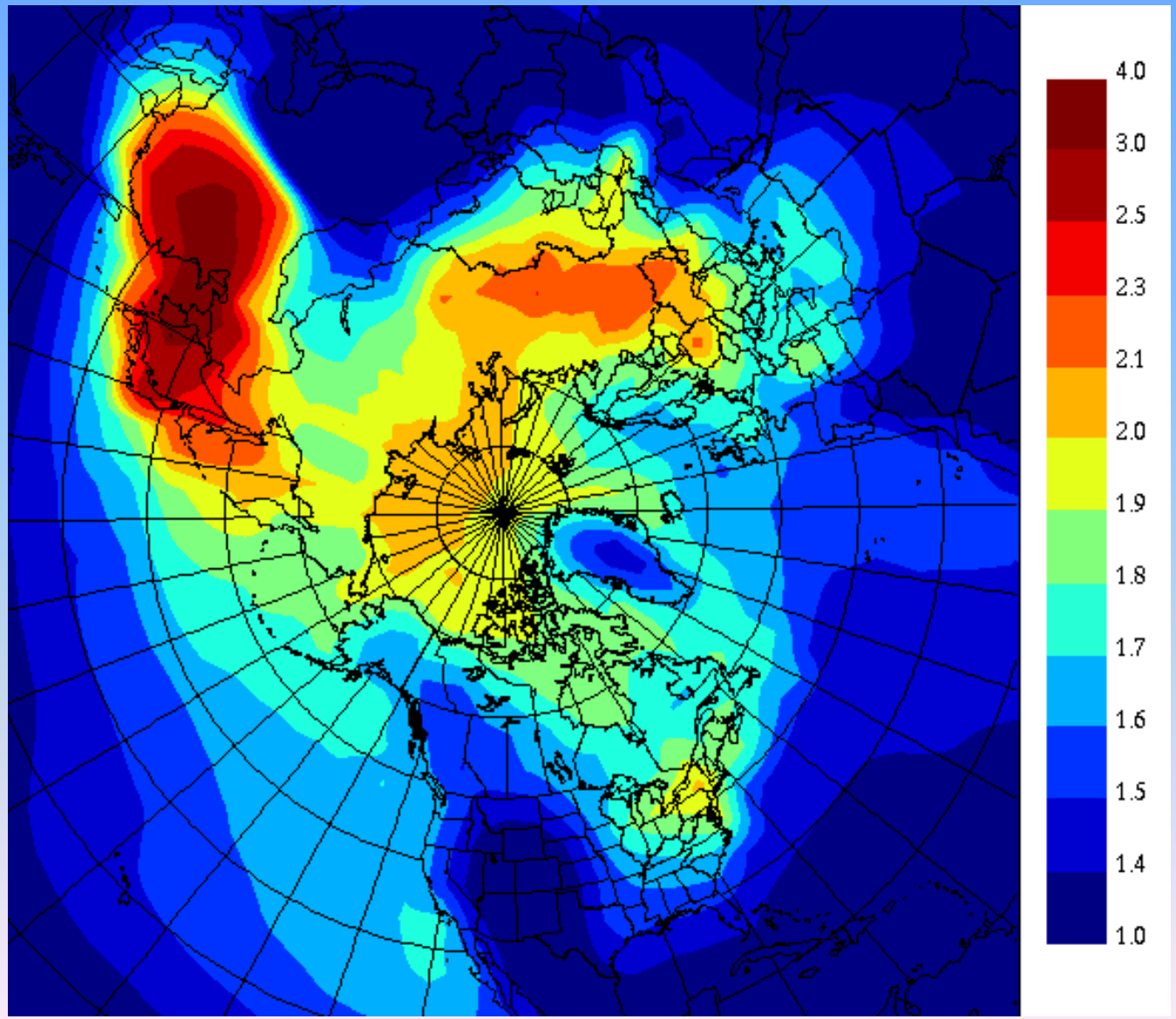
# Mercury Concentration in Precipitation (ng/L) Trend



# Mercury Modelling



# Modelled Mercury Air Concentration (ng/m$^3$) for 2000



# Conclusions

- Once in the atmosphere, mercury can be long range transported around the globe.
- Atmospheric mercury is primarily GEM (>98%). The remainder is RGM and p-Hg.
- Mercury is incorporated into precipitation.
- The long range transport of mercury can be modelled to indicate source regions for receptor sites.